

Fig. 11 illustrates total cardboard consumed by termites in baited traps in Example 4.

Fig. 12 illustrates number of positive traps in Example 5.

Fig. 13 illustrates wood consumed in Example 5.

Fig. 14 illustrates baited trap discovery time in Example 5.

Fig. 15 illustrates number of positive traps in Example 6.

Fig. 16 illustrates wood consumed in Example 6.

Fig. 17 illustrates baited trap discovery time in Example 6.

Fig. 18 illustrates number of positive traps in Example 7.

Fig. 19 illustrates wood consumed in Example 7.

Fig. 20 illustrates baited trap discovery time in Example 7.

Fig. 21 illustrates number of *R. tibalis* recovered in bioassays of Example 8.

Fig. 22 illustrates number of *R. virginicus* recovered in bioassays of Example 8.

Fig. 23 illustrates CO₂ concentration in bioassays of Example 8.

Fig. 24 illustrates number of positive traps in Example 9.

Fig. 25 illustrates number of positive traps in Example 10.

Fig. 26 illustrates number of positive traps in Example 11.

Fig. 27 illustrates termite response for *R. flavipes* in Example 12.

Fig. 28 illustrates termite response for *R. tibalis* in Example 12.

Fig. 29 illustrates termite response for *R. virginicus* in Example 12.

Fig. 30 illustrates a first response in Example 12.

Fig. 31 illustrates area eaten for different types of wood in Example 14.

Fig. 32 shows a graph of the area eaten by termites in Example 15.

Fig. 33 shows a graph of the number of termites near treated Dow wood, near untreated Dow wood, and between the two pieces of wood (i.e., or middle area).

Fig. 34 illustrates a glass bead bioassay apparatus with candidate chemical cues in shell vials, and in particular, a bioassay apparatus using shell vials as chemical sources for Example 18 of the Detailed Description.

Fig. 35 illustrates a choice-test bioassay with a germinating corn seed versus air, and in particular, the number of western corn root worm (WCR) larvae attracted to a germinating corn seed versus air as described in Example 18 of the Detailed Description.

Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 36 illustrates a choice-test bioassay with cut corn roots (0.34 grams) versus air, and in particular, the number of western corn root worm larvae attracted to cut corn roots versus air in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

CI
cont.
Fig. 37 illustrates CO₂ concentrations (measured with GC-MS-SIM) of germinating corn seed and air in shell vials for Example 18 of the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 38 illustrates concentrations of CO₂ (measured with gas chromatography-mass spectrometry in selected ion monitoring mode (GC-MS-SIM)) of corn roots and air in shell vials for Example 18 of the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 39 illustrates a glass bead bioassay apparatus with candidate chemical cues in syringes, and in particular, the bioassay apparatus using syringes as chemical sources in Example 18 of the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 40 illustrates a choice-test bioassay with headspace over germinating corn seeds versus air, and in particular, the number of western corn root worm (WCR) larvae attracted to a headspace over germinating corn seeds versus air in Example 18 of the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 41 illustrates a choice-test bioassay with CO₂ (10 mmol/mol) versus air, and in particular, the number of western corn root worm larvae attracted to a CO₂ concentration of 10 mmol/mol versus air in Example 18 of the Detailed Description.

Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 42 illustrates concentrations of CO₂ (measured with GC-MS-SIM) of headspace over germinating corn seeds and air in syringes in Example 18 of the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 43 illustrates concentrations of CO₂ (measured with GC-MS-SIM) of CO₂ (10 mmol/mol) and ambient air in syringes as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 44 illustrates concentrations of CO₂ (measured with GC-MS-SIM) from syringes measured every 10 minutes with syringe pump turned on for Example 18.

Fig. 46 illustrates a choice-test bioassay with CO₂ in syringe sources to attract western corn root worm larvae in Example 18. Bars "I" represent standard errors.

Fig. 47 illustrates CO₂ concentrations (measured with GC-MS-SIM) of mixtures in syringes as discussed in Example 18.

Figs. 48-52 illustrate various choice-test bioassays with syringe sources containing 1 mmol/mol minimum CO₂ (Fig. 48), 2 mmol/mol minimum CO₂ concentration (Fig. 49), 5 mmol/mol minimum CO₂ concentration (Fig. 50), 10 mmol/mol minimum CO₂ concentration (Fig. 51), and 20 mmol/mol minimum CO₂ concentration (Fig. 52). In particular, Fig. 48 shows the preferences of western corn root worm larvae when exposed to 1 mmol/mol versus each of 1, 1.115, 1.125 and 1.5 mmol/mol minimum CO₂ concentration. Fig. 49 shows the preferences of western corn root worm larvae when exposed to 2 mmol/mol versus each of 2, 2.115, 2.25 and 2.5 mmol/mol minimum CO₂ concentration. Fig. 50 shows the preferences of western corn root worm larvae when exposed to 5 mmol/mol versus each of 5, 5.125, 5.25 and 5.5 mmol/mol minimum CO₂ concentration. Fig. 51 shows the preferences of western corn root worm larvae when exposed to 10 mmol/mol versus each of 10, 10.125, 10.25 and 10.5 mmol/mol minimum CO₂ concentration. Fig. 52 shows the preferences of western corn root worm larvae when exposed to 20 mmol/mol versus each of 20, 20.125, 20.25

and 20.5 mmol/mol minimum CO₂ concentration. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 53 illustrates a choice-test bioassay with shell vials containing different dilutions of carbonated water for attracting western corn root worm larvae as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 54 illustrates concentrations (measured with GC-MS-SIM) of carbonated water dilutions in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 55 illustrates a choice-test bioassay with syringe sources containing the headspace from different dilutions of carbonated water for Example 18 of the Detailed Description. Significant differences ($p < 0.05$) in attraction to a particular dose of CO₂ and its corresponding control are indicated by different lower case letters. Bars "I" represent standard errors (many are too small to be visible).

Fig. 56 illustrates CO₂ concentrations (measured with GC-MS-SIM) from the headspace over each dilution carbonated water. Significant differences ($p < 0.05$) in attraction to a particular dose of CO₂ and its corresponding control are indicated by different lower case letters. Bars "I" represent standard errors (many are too small to be visible).

Fig. 57 illustrates a controlled choice-test bioassay with shell vials containing air on both sides for determining the attraction of western corn root worm larvae as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard error.

Fig. 58 illustrates a controlled choice-test bioassay with shell vials containing carbonated water on both sides for thereby determining attraction of western corn root worm larvae to carbonated water as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard error.

Fig. 59 illustrates a controlled choice-test bioassay with syringes containing air on both sides for determining the attraction of western corn root worm larvae as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard error.

Fig. 60 illustrates a controlled choice-test bioassay with syringes containing CO₂ on both sides for determining the attraction of western corn root worm larvae to carbon dioxide as described in Example 18. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard error.

CI Cont.
Fig. 61 shows a graph of concentrations of CO₂ (measured with SIM-CG-MS) from soil near growing corn root worms, soil alone and ambient air. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 62 shows a glass bead bioassay apparatus with candidate chemical cues in syringes for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 63 illustrates a choice-test bioassay with syringe sources containing the headspace from germinating corn seedlings versus three different concentrations of CO₂ alone with larvae from a non-diapausing strain of western corn root worm for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 64 illustrates a graph of CO₂ concentrations (measured with GC-MS-SIM) of headspace over germinating corn seeds and CO₂ mixtures and syringes for the choice-test with larvae from a non-diapausing strain of western corn root worm in Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 65 illustrates a graph of a choice-test bioassay with syringe sources containing the headspace from germinating corn seedlings versus three different concentrations of CO₂ alone with larvae from a diapausing strain of corn root worm in

Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 66 illustrates a graph of the concentrations of the CO₂ (measured with GC-MS-SIM) of headspace over germinating corn seeds and CO₂ mixtures in syringes for the choice-test with larvae from a diapausing strain of western corn root worm in Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

CI Cont.
Fig. 67 illustrates the graph of a choice-test bioassay with syringe sources containing the headspace from germinating corn seedlings versus three concentrations of CO₂ alone and the glass beads in the treatment side coated with the volatiles from the corn headspace for Example 19 described in the Detailed Description. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 68 illustrates a graph of the CO₂ concentrations (measured with GC-MS-SIM) of the headspace over germinating corn seeds and the CO₂ mixture in syringes for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 69 shows a graph of a choice-test bioassay with syringe sources containing the atmosphere from soil containing growing corn plants versus three different concentrations of CO₂ alone, and in particular, illustrates corn root worm larvae attracted to syringe sources containing the atmosphere from soil having growing corn plants versus the three different concentrations of CO₂ in Example 19. Standard differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors (for some treatments, the standard errors are too small to be visible on the graph).

Fig. 70 illustrates a graph of CO₂ concentrations (measured with GC-MS-SIM) of the corn/soil headspace and the CO₂ mixtures in syringes for Example 19. Standard differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent

standard errors (for some treatments, the standard errors are too small to be visible on the graph).

Fig. 71 illustrates a western corn root worm larvae choice-test bioassay with soil removed from the roots of growing corn plants versus control soil for Example 19. Syringe sources on the treatment side contain 5 mmol CO₂ and the syringe sources on the control side contain three different concentrations of CO₂ alone. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors (some of which are too small to be visible).

Fig. 72 illustrates CO₂ concentrations (measured with GC-MS-SIM) of the CO₂ mixtures in the syringes for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors (some of which are too small to be visible).

Fig. 73 illustrates a graph of a western corn root worm larvae choice-test bioassay with syringe sources containing the headspace from germinating corn seedlings that have been fed upon by western corn root worm larvae versus three different concentrations of CO₂ alone for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 74 shows a graph of CO₂ concentrations (measured with GC-MS-SIM) of headspace over western corn root worm damaged corn seedlings and CO₂ mixtures in the syringes for Example 19. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors.

Fig. 75 shows a three petri dish test bioassay apparatus.

Fig. 76 shows a graph of a western corn root worm larvae choice-test bioassay with cryogenic collections of corn volatiles plus CO₂ versus CO₂ alone, using second-instar western corn root worm larvae. Significant differences ($p < 0.05$) are indicated by different lower case letters. Bars "I" represent standard errors (for some CO₂ measurements, the standard errors are too small to be visible on the graph).

Fig. 77 illustrates a graph of CO₂ concentrations (measured with GC-MS-SIM) taken from inside the bioassay apparatus of Fig. 75. Significant differences ($p < 0.05$) are

indicated by different lower case letters. Bars "I" represent standard errors (for some CO₂ measurements, the standard errors are too small to be visible on the graph).

Fig. 78 illustrates a graph of the number of western corn root worm larvae staying on paper with regard to corn, water, CGA plus corn, and CGA.

Fig. 79 and 80 show graphs that illustrate that corn root worm larvae can be controlled by providing a combination of attractant granules and the insecticide Thiamethoxam (also identified herein as "CGA-293343," or "CGA-293," or simply "CGA"), and in particular the graphs of these figures illustrate the results of western corn root worm larvae bioassays with and without the larvae being exposed to Thiamethoxam.

Fig. 81 illustrates the results of a trial conducted with CO₂ and feeding stimulants in combination with various rates of CGA-293343 (i.e., Thiamethoxam).

Fig. 82 illustrates a graph of corn root worm larvae (*Diabrotica* species) larval bioassay in soil tubs using various increasing amounts of Thiamethoxam.

Fig. 83 shows a graph of termite bait field test using Formulation 4 described in the Detailed Description herein below.

Please delete the paragraph beginning on page 7, lines 21 through 31 and replace it with the following paragraph:

The present inventors incorporate by reference the following U.S. Patents in their entirety, such patents disclosing various compounds and formulations that are useful in conjunction with the present invention. U.S. Patent No. 5,338,551 filed July 2, 1992 to Lajoie; U.S. Patent No. 5,342,630 filed July 1, 1992 to Jones; U.S. Patent No. 5,346,704 filed August 11, 1993, to Lajoie; U.S. Patent No. 5,389,386 filed June 30, 1994 to Winston et al., U.S. Patent Nos. 5,415,877 filed December 22, 1993, 5,424,270 filed July 7, 1993, 5,425,952 filed October 13, 1993, 5,432,146 filed December 20, 1993, 5,432,147 filed October 19, 1994, 5,432,148 filed December 7, 1994, 5,443,835 filed September 30, 1993 and 5,464,805 filed March 23, 1995 to Winston; U.S. Patent No. 5,468,715 filed June 2, 1993 to Joseph et al.; U.S. Patent Nos. 5,468,716 filed October 3, 1994, 5,496,568 filed June 26, 1995, 5,518,986 filed April 4, 1995, 5,518,987 filed October 3, 1995 and 5,583,089 filed May 9, 1995 to Winston.

Please amend the paragraph beginning on page 17, line 14 as follows:

Results:

- C^B
1. Traps baited with dried spent brewer's grain (Formulation 1) were discovered sooner by termites than unbaited traps (Fig. 4).
 2. Termites consumed more cardboard from baited traps than from unbaited traps (data collected, but not shown here).
 3. Termites were found more often in the baited traps than the unbaited traps (Fig. 5).
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✓ Please delete Graphs 1A and 2A on page 18.

✓ Please delete Graph 3A on page 19.

Please amend the paragraph beginning on page 21, line 9 as follows:

Results:

- C^H
1. The discovery time was shorter for the baited traps than for the unbaited traps (Fig. 6).
 2. More cardboard was consumed by termites in the baited traps for weeks 1 through 7 (Fig. 7).
 3. Termites were found more often in the baited traps than the unbaited traps (data collected, but not shown here).
-

✓ Please delete Graphs 2A and 2B on page 22.

Please amend the paragraph beginning on page 24, line 6 as follows:

Results:

- C⁵
1. Traps baited with whole malted barley (Formulation 3) were not discovered sooner by termites than unbaited traps (Fig. 8). Within 3 weeks, 10 baited and 10 unbaited traps had been discovered by termites.
 2. Termites did not consume more cardboard from baited traps than from unbaited traps (Fig. 9).
-

3. Termites were not found more often in the baited traps than the unbaited traps (data collected, but not shown here).

✓ Please delete Graphs 3A and 3B on page 25.

Please amend the paragraph beginning on page 27, line 9 as follows:

Results:

C₆
1. Traps baited with coated sucrose pellets (Formulation 4) were not discovered sooner by termites than unbaited traps (Fig. 10). Within 3 weeks, 10 baited and 10 unbaited traps had been discovered by termites.

2. Termites did not consume more cardboard from baited traps than from unbaited traps (Fig. 11).

3. Termites were not found more often in the baited traps than the unbaited traps (data collected, but not shown here).

✓ Please delete Graphs 4A and 4B on page 28.

Please amend the paragraph beginning on page 30, line 7 as follows:

Results:

C₇
1. Traps baited with dried spent brewer's grain (Formulation 1) were discovered sooner by termites than unbaited traps (Fig. 12).

2. Termites consumed more wood from baited traps than from unbaited traps (Fig. 13).

3. Termites were found more often in the baited traps than the unbaited traps (Fig. 14).

✓ Please delete Graphs 5A, 5B and 5C on page 31.

Please amend the paragraph beginning on page 33, line 10 as follows:

Results:

C₈ cont
1. The discovery time was shorter for the baited traps than for the unbaited traps (Fig. 15).

C8
Conceded!
2. More wood was consumed by termites in the unbaited traps than from the baited traps for weeks 1 and 2, but more was consumed from the baited traps in weeks 3 and 4 (Fig. 16).

3. Termites were found more often in the baited traps than the unbaited traps (Fig. 17).

✓
Please delete Graphs 6A, 6B and 6C on page 34.

Please amend the paragraph beginning on page 36, line 8 as follows:

Results:

C9
1. The discovery time was shorter for the baited traps than for the unbaited traps (Fig. 20).

2. More wood was consumed by termites in the baited traps than from the unbaited traps (Fig. 19).

3. Termites were found more often in the baited traps than the unbaited traps (Fig. 18).

✓
Please delete Graphs 7A, 7B and 7C on page 37.

Please amend the paragraph beginning on page 39, line 22 as follows:

Results:

C10
C.
Formulation 1: Dried Spent Grain (0.5 g per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for both species of termites (Figs. 21 and 22, Formulation 1). The average CO₂ concentration at the start of the bioassay was 6.48 mmol per mol (Fig. 23, Formulation 1).

Please amend the paragraph beginning on page 39, line 28 as follows:

C11
Cont.
Formulation 2: Dried Ground Germinated Corn Seeds (0.5 g per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig 21, Formulation 2). Slightly more termites were recovered from the treated cups than the controls in tests with *Reticulitermes virginicus* (Fig. 22, Formulation 2).

C10
Conced

The average CO₂ concentration at the start of the bioassay was 5.55 mmol per mol (Fig. 23, Formulation 2).

Please amend the paragraph beginning on page 40, line 1 as follows:

C17

Formulation 3: Whole, malted barley (0.5 g per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 3). Slightly more termites were recovered from the treated cups than the controls in tests with *Reticulitermes virginicus* (Fig. 22, Formulation 3). The average CO₂ concentration at the start of the bioassay was 3.7 mmol per mol (Fig. 23, Formulation 3).

C18

Please amend the paragraph beginning on page 40, line 9 as follows:

Formulation 4: Sucrose pellets with a light wax coating (0.5 g per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 4). The average CO₂ concentration at the start of the bioassay was 5.22 mmol per mol (Fig. 23, Formulation 4).

C19

Please amend the paragraph beginning on page 40, line 15 as follows:

Formulation 5: Effervescent tablets (Fizzies brand drink tablets, 0.25 g per 25 g soil): There was no significant difference in the number of termites recovered from the treatment and the control for *Reticulitermes tibialis* (Fig. 21, Formulation 5). The average CO₂ concentration at the start of the bioassay was 38.19 mmol per mol (Fig. 23, Formulation 5).

C19

Please amend the paragraph beginning on page 40, line 21 as follows:

Formulation 6: Yeast Granules (made from corn flour, corn syrup, NYPD nutrient broth and baker's yeast, 0.5 g granules per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 6). There was no significant difference in the number of termites recovered from the treatment and the control for *Reticulitermes virginicus* (Fig. 22, Formulation 6). The average CO₂ concentration at the start of the bioassay was 5.60 mmol per mol (Fig. 23, Formulation 6).

Please amend the paragraph beginning on page 40, line 31 as follows:

C16
Formulation 7: Dry Baker's Yeast (0.25 g granules per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 7). The average CO₂ concentration at the start of the bioassay was 5.93 mmol per mol (Fig. 23, Formulation 7).

Please amend the paragraph beginning on page 41, line 1 as follows:

C17
Formulation 8: Potassium Bicarbonate, Fine Granules (0.25 g granules per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 8). The average CO₂ concentration at the start of the bioassay was 16.71 mmol per mol (Fig. 23, Formulation 8).

Please amend the paragraph beginning on page 41, line 7 as follows:

C18
Formulation 9: Clean Cracked Corn (sold as livestock feed) (0.5 g granules per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 9). The average CO₂ concentration at the start of the bioassay was 4.21 mmol per mol (Fig. 23, Formulation 9).

Please amend the paragraph beginning on page 41, line 13 as follows:

C19
Formulation 10: Ground Dry Corn Seed (0.5 g granules per 25 g soil): Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 10). The average CO₂ concentration at the start of the bioassay was 4.48 mmol per mol (Fig. 23, Formulation 10).

Please amend the paragraph beginning on page 41, line 19 as follows:

C20
Formulation 11: Ground Malted Barley (0.5 g granules per 25 g soil): There was no significant difference in the number of termites recovered from the treatment and the control for *Reticulitermes tibialis* (Fig. 21, Formulation 11). The average CO₂ concentration at the start of the bioassay was 8.31 mmol per mol (Fig. 23, Formulation 11).

C21 Please amend the paragraph beginning on page 41, line 25 as follows:

Formulation 12: Baking Powder/Corn Syrup Granules (0.5 g granules per 25 g soil):

These granules were made from double-acting baking powder and corn syrup.

Significantly more termites were recovered from the treated cups than the controls for *Reticulitermes tibialis* (Fig. 21, Formulation 12). The average CO₂ concentration at the start of the bioassay was 18.86 mmol per mol (Fig. 23, Formulation 12).

Please amend the paragraph beginning on page 41, line 33 as follows:

C22 **Conclusions:**

1. In laboratory behavioral bioassays, *Reticulitermes tibialis* exhibited attraction to formulations 1, 2, 3, 4, 6, 7, 8, 9, 10 and 12 (Fig. 21). In this particular context, *Reticulitermes tibialis* were not attracted to formulation 5 or 11.
2. In laboratory bioassays, *Reticulitermes virginicus* exhibited attraction to formulations 1, and 2 (Fig. 22). In this particular context, *Reticulitermes virginicus* were not attracted to formulation 3 or 4.
3. All the formulations contained elevated CO₂ by comparison with controls (Fig. 23).

✓ Please delete Graphs 8A and 8B on page 43.

✓ Please delete Graph 8C on page 44.

Please amend the paragraph beginning on page 46, line 15 as follows:

C23 **Results:**

1. Termites were present in the baited traps for 5 out of 6 weeks of the experiment (Fig. 24).
2. Termites were present in the soil-only control traps during week 1, 4, and 6 (Fig. 24).
3. Termites were not present in any of the Dow control traps during the entire 6 weeks (Fig. 24).
4. Feeding on the wood strips was heavier in the baited traps and in the soil-only control traps than in the unmodified Dow Sentricon Bait Stations (data collected, but not shown).

✓ Please delete Graph 9 on page 48.

Please amend the paragraph beginning on page 50, line 18 as follows:

C24
Results:

1. Termites were present in the baited traps for weeks 1 and 2 of the experiment (Fig. 25).
2. Termites were present in the soil-only control traps during week 3 (Fig. 25).
3. Termites were present in the Dow control traps during weeks 2 and 5 (Fig. 25).

✓ Please delete Graph 10 on page 51.

Please amend the paragraph beginning on page 53, line 17 as follows:

C25
Results:

1. Termites were present in the baited traps for weeks 1 through 4 of the experiment (Fig. 26).
2. Termites were present in the soil-only control traps during all 6 weeks of the experiment (Fig. 26).
3. Termites were present in the Dow control traps during weeks 1 and 2 (Fig. 26).

✓ Please delete Graph 11 on page 54.

Please amend the paragraph beginning on page 57, line 4 as follows:

C26
Results:

1. *Reticulitermes tibialis* was attracted to 5, 10, and 20 mmol per mol CO₂ (graph 12B). *R. tibialis* demonstrated the best attraction to 5 mmol per mol CO₂ (Fig. 28).
2. *Reticulitermes flavipes* was attracted to 2, 5 and 10 mmol per mol CO₂. *R. flavipes* was most attracted to 10 mmol per mol (Fig. 27).
3. *Reticulitermes virginicus* was attracted to 5, 10, 20 and 50 mmol per mol CO₂. *R. virginicus* demonstrated best attraction to 10 mmol per mol CO₂ (Fig. 29).

✓ Please delete Graphs 12A and 12B on page 58.

Please delete Graphs 12C and 12D on page 59.

Please amend the paragraph beginning on page 63, line 8 as follows:

Results:

- C27
1. For the Dow wood, termites were observed feeding on the charred Dow wood, and were not observed feeding on the uncharred Dow Wood.
 2. Examination of the charred and uncharred Dow Wood at the end of the experiment indicated that most of the feeding had occurred on the charred Dow Wood (Fig. 31).
 3. Insects that had fed on the charred Dow Wood had black material inside the hindgut clearly visible through the abdomen, confirming that they fed on this burnt wood.
 4. For the Ponderosa pine, termites were never observed feeding on the charred Ponderosa pine, and fed only on the uncharred Ponderosa pine.
 5. Examination of the charred and uncharred Ponderosa pine at the end of the experiment indicated that all of the feeding had occurred on the uncharred Ponderosa pine (Fig. 31).

✓ Please delete Graph 14 on page 64.

Please amend the paragraph beginning on page 66, line 16 as follows:

Results:

- C28
1. Termites were concentrated near the Dow wood impregnated with Formulation 1 (dried spent brewer's grain), and were observed near the Dow wood piece that was untreated (Fig. 33).
 2. Extensive feeding damage by termites was observed on the Dow wood impregnated with Formulation 1 (dried spent brewer's grain), but no feeding damage was observed on the Dow wood piece that was untreated (Fig. 32).

✓ Please delete Graph 15 on page 67.

Please amend the paragraph beginning on page 77, line 32 as follows:

C29
Bioassay Apparatus. The choice-test bioassay apparatus (Fig. 34) was constructed from a glass Y-tube filled with glass beads to simulate the thigmotactic cues of the soil environment that are ordinarily encountered by western corn root worm larvae. The glass Y-tube was fabricated by a local glassblower (9.5 mm inside diameter, 60° angles, with each branch 3 cm long), and clamped to a ring stand with 2 branches of the "Y" facing down. A glass connection tube (4 cm long, 0.5 cm diameter) with a piece of vinyl screen (2.5-mm mesh) held over 1 end by a 0.5-cm section of Teflon tubing (6 mm inside diameter) was inserted snugly into the end of each of the arms of the Y-tube to support the glass beads. Glass beads (3 mm, cat. no. 11-312A, Fisher Scientific, Pittsburgh, PA) were poured into the top of the Y-tube, filling the entire apparatus to within 0.5 cm of the top (250 beads). A 5-mm NMR tube cap (cat. no. 100-0050, Drummond Scientific, Broomall, PA) was fitted into the other end of each glass connection tube, with a hole to allow snug insertion of a 20-cm piece of slender Teflon tubing (0.8 mm inside diameter) for introduction of volatile chemical cues into each arm of the bioassay apparatus. Two techniques were used to introduce candidate chemical cues into the 2 arms of the apparatus: 1 used shell vials as chemical sources, and the other used syringes as chemical sources.

Please amend the paragraph beginning on page 78, line 25 as follows:

C30
cont.
Shell Vial Sources. In this 1st approach (Fig. 34), two 35-ml polyethylene syringes (cat. no. 106-0490, Sherwood Medical, St. Louis, MO) were filled with ambient air, and the air was pumped through shell vials containing candidate chemical cues. Glass shell vials (4 ml) with polyethylene caps were used (cat. no. B7785-1, Baxter Healthcare, McGaw Park, IL). A 35-ml syringe was snugly connected with slender Teflon tubing (20 cm) to a hole in the cap of the shell vial. A 2nd piece of slender Teflon tubing was used to connect the shell vial to 1 arm of the bioassay apparatus. The 2 syringes used for each bioassay were connected to a syringe pump (Sage Model 355, Fisher Scientific, Pittsburgh, PA) that provided an airflow through each shell vial containing a candidate chemical treatment, and subsequently into a choice arm of the bioassay apparatus. For the shell vial

C30
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sources of candidate chemical compounds, the shell vial containing either a carbonated water dilution or a corn seed or cut corn roots was left open for 5 min to allow the gas concentrations to reach equilibrium. The vial was capped, and the syringe pump was started, providing an airflow of 1.0 ml/min from each syringe.

Please amend the paragraph beginning on page 79, line 14 as follows:

C31

Syringe Sources. In this 2nd approach (Fig. 39), 35-ml polyethylene syringes were filled directly with candidate chemical cues (such as the headspace from a container of germinating corn, a sample of CO₂ mixed with air, or the headspace from a bottle of carbonated water). Each of the 2 syringes was connected with slender Teflon tubing to 1 arm of the bioassay apparatus. The 2 syringes used for each bioassay were connected to a syringe pump that was adjusted to provide an airflow of 1 ml/min from each syringe.

Please amend the paragraph beginning on page 79, line 24 as follows:

C32
Conf

Bioassay Procedure. For bioassays, 20 newly hatched 1st instars (0--12 hours old) were collected from tubs containing eggs in soil (by using a camel's hair brush) and placed in a covered 5-mm NMR cap with 2 holes (1 mm diameter) drilled in the bottom (Fig. 34 and Fig. 39). These holes were temporarily plugged with a piece of wire bent into a U-shape. The open end of the NMR cap was sealed with a small square of cellophane held in place with a plastic tube (a piece of soda straw) that fit snugly over the open end. The Y-tube apparatus was assembled and filled with glass beads and the appropriate treatment and control sources (shell vials or syringes) were connected to the arms of the Y-tube. The syringe pump was set to provide a flow of 1 ml/min and turned on. A flow meter was used to verify that the flow exiting the top of the Y-tube was 2 ml/min, confirming the flow of volatiles through the apparatus and verifying that there were no leaks in the connections. If the flow was inadequate, all connections were inspected and secured, and the flow was rechecked. After 3 min of pumping, the wire piece blocking the 2 holes in the NMR cap was removed and the cap was placed in the top of the Y-tube, allowing larvae to crawl out through the 2 holes and down into the glass beads. Bioassays were conducted for 30 min. The entire Y-apparatus was disassembled, and the positions of the larvae were recorded. Larvae were not reused in subsequent tests. Before each test, all

glass parts of the apparatus were washed with soap and water, rinsed with water, and heated at 80°C in an oven for 30 min.

Please amend the paragraph beginning on page 81, line 20 as follows:

Corn Headspace Bioassay. Using the syringe source technique, the headspace over germinating corn seedlings was tested to determine the larval response to corn volatiles in the glass bead apparatus. Washed corn seeds were spread on moistened germination paper inside a covered plastic container (30 by 15 cm) and germinated for 3 days to allow volatile corn compounds to be produced. A 35-ml polyethylene syringe was filled with the headspace containing these volatile compounds by means of a 25 cm length of slender Teflon tubing inserted into a hole drilled into the cover. The control syringe was filled from an identical plastic container containing only moistened germination paper. The CO₂ concentrations of the syringes were determined by using GC-MS-SIM before each bioassay.

Please amend the paragraph beginning on page 87, line 13 as follows:

Germinating Corn Seed Versus Air Choice Test. In experiments using shell vial sources, significantly more western corn root worm larvae ($P < 0.05$) were attracted to the side containing the germinating corn seed than to the control side (Fig. 35). The CO₂ concentration of the headspace above the germinating corn seed was 6.04 ± 0.83 (mean \pm SEM) mmol/mol, and the CO₂ concentration of the headspace on the control side was 0.99 ± 0.08 mmol/mol (Fig. 37).

Please amend the paragraph beginning on page 87, line 22 as follows:

Cut Corn Roots Versus Air Choice Test. Significantly more western corn root worm larvae ($P < 0.05$) were attracted to the side containing cut corn roots than to the control side (Fig. 36). The CO₂ concentration of the headspace above germinating corn roots was 2.97 ± 0.15 mmol/mol, and the CO₂ concentration of the headspace on the control side was 0.99 ± 0.08 mmol/mol (Fig. 38).

Please amend the paragraph beginning on page 87, line 30 as follows:

C36
Corn Headspace Bioassay. In bioassays with syringe sources, significantly more western corn root worm larvae ($P < 0.05$) were attracted to the side containing the headspace over germinating corn seeds than to the control side (Fig. 40). The CO₂ concentration of the headspace above the germinating corn seeds was 5.38 ± 0.45 mmol/mol, and the CO₂ concentration of the headspace on the control side was 1.14 ± 0.13 mmol/mol (Fig. 42).

Please amend the paragraph beginning on page 88, line 7 as follows:

C37
CO₂ Bioassay. In a preliminary experiment to verify attraction of the larvae to syringe sources containing CO₂, significantly more western corn root worm larvae ($P < 0.05$) were attracted to the side containing 10 mmol/mol CO₂ (10.43 ± 0.18 mmol/mol) than to the control side (Fig. 41). The CO₂ concentration of the control side was 0.93 ± 0.04 mmol/mol (Fig. 43).

Please amend the paragraph beginning on page 88, line 14 as follows:

C38
Consistency of CO₂ Delivery. The release of CO₂ from syringe sources was highly consistent over the course of a 30-min bioassay interval (Fig. 44). The release of CO₂ from shell vial sources was consistent over the course of a 30 min bioassay interval for the lower doses tested (0, 1, 3, and 10%), but not for the higher doses (30 and 100%) (Fig. 45).

Please amend the paragraph beginning on page 88, line 21 as follows:

C39
CO₂ (Dose—Response). The larvae were attracted to a wide range of CO₂ concentrations. The lowest concentration of CO₂ that was attractive to the larvae (Figs. 46 and 47) was 1.34 ± 0.05 mmol/mol (10 µl of CO₂ added to syringe) ($P < 0.05$), where the control CO₂ concentration was 0.91 ± 0.03 . The highest dose to which the larvae were attracted was 85.60 ± 1.20 mmol/mol. (3 ml of CO₂ added to syringe). They were not attracted to 300 mmol/mol (10 ml of CO₂ added to syringe) or 900 mmol/mol (30 ml of CO₂ added to syringe) concentrations (Fig. 46).

Please amend the paragraph beginning on page 88, line 31 as follows:

CH₀
CO₂ Selective Response. Significantly more larvae were attracted (Fig. 48) to the higher CO₂ concentration for 1 versus 1.50 mmol/mol, for 2 versus 2.50 mmol/mol (Fig. 49), for 5 versus 5.50 mmol/mol (Fig. 50), and for 10 versus 10.50 mmol/mol (Fig. 51), but no difference in attraction was observed for 20 versus 20.50 mmol/mol of CO₂ (Fig. 52). When smaller CO₂ differences were tested (0.25 mmol/mol), fewer significant differences were observed. Larvae were more attracted to the higher CO₂ concentration for 1 versus 1.25 mmol/mol (Fig. 48), and for 2 versus 2.25 mmol/mol (Fig. 49), but no difference in attraction was observed for 5 versus 5.25 mmol/mol (Fig. 50), for 10 versus 10.25 mmol/mol (Fig. 51), or for 20 versus 20.25 mmol/mol (Fig. 52). At the smallest CO₂ difference tested, significantly greater attraction was observed to 1.125 mmol/mol than to 1 mmol/mol (the actual CO₂ concentration of the treatment side was 1.18 ± 0.05 mmol/mol, and the actual control concentration was 1.06 ± 0.05 mmol/mol), but no difference in attraction was observed in any of the tests at higher concentrations. In control tests with equal amounts of CO₂ on both sides (1, 2, 5, 10, or 20 mmol/mol), no significant differences in attraction were observed.

Please amend the paragraph beginning on 89, line 21 as follows:

CH₁
Diluted Carbonated Water (Dose—Response). In Bioassays with shell vial sources, the 3% dilution of carbonated water was the lowest attractive dose (Fig. 53) ($P < 0.05$). The larvae responded optimally to the 10% dilution of the carbonated water, and all concentrations (3, 10, 30, and 100%) greater than the 1% dilution were significantly more attractive ($P < 0.05$) than the control (distilled water). The CO₂ concentration of the control (distilled water) was 1.42 ± 0.08 mmol/mol, and the concentration of the 1% dilution was 1.48 ± 0.10 mmol/mol (Fig. 54). The CO₂ concentration of the 3% dilution was 1.91 ± 0.09 mmol/mol, and the 10% dilution produced 2.55 ± 0.12 mmol/mol of CO₂. The 30% dilution produced 6.06 ± 0.36 mmol/mol of CO₂, and the 100% carbonated water produced 24.49 ± 0.22 mmol/mol of CO₂.

Please amend the paragraph beginning on page 90, line 3 as follows:

C42
Shell Vial Control Bioassays. There was no significant difference ($P > 0.05$) between the numbers of larvae moving to the right and to the left when no chemical treatment was present on either side of the choice test. Western corn root worm larvae moved slowly through the glass beads, and after 30 minutes, equal numbers of larvae were found in the right and left arms of the Y-tube. The CO_2 concentration in the shell vials containing ambient air was 0.99 ± 0.08 mmol/mol. Larvae also chose equally between the right and left sides of the choice test when carbonated water was present on both sides in shell vial sources ($P > 0.05$). Each shell vial of carbonated water produced 24.49 ± 1.31 mmol/mol of CO_2 .

Please amend the paragraph beginning on page 93, line 5 as follows:

C43
In syringe source bioassays, the larval response to CO_2 increased with each increase in the amount of CO_2 added to the syringe mixtures (1, 3, 10, μl of CO_2) (Fig. 47) when the control side contained 1.00 ± 0.05 to 85.6 ± 1.20 mmol/mol. The most attractive concentrations of CO_2 were 2.51 ± 0.13 mmol/mol (30 μl of CO_2 added to the syringe), and 4.20 ± 0.21 mmol/mol (100 μl added to the syringe). This range of attractive concentrations of CO_2 is consistent with the level of CO_2 produced by a germinating corn seed in a shell vial (6.04 ± 0.83 mmol/mol), cut corn roots in a shell vial (2.97 ± 0.15 mmol/mol), and also with the concentration found in the headspace above 50 g (dry wt) of germinating corn seeds (5.38 ± 0.45 mmol/mol). The concentration of CO_2 measured in soil near the roots of growing corn plants (4.36 ± 0.31 mmol/mol) was consistent with the optimally attractive range of concentrations (2.51 ± 0.13 to 4.20 ± 0.21 mmol/mol), indicating that the bioassay technique produced gradients of CO_2 similar to those that are behaviorally active in the soil.

✓ Please delete the paragraphs beginning on page 96, line 4 through page 98, line 7.

✓ Please delete Graphs 18-1A, 18-1B, 18-1C, 18-1D and 18-1E on page 99.

✓ Please delete Graphs 18-2A, 18-2B, 18-2C, 18-2D and 18-2E on page 100.

✓ Please delete Graph 18-3 on page 101.

✓ Please delete Graphs 18-4A and 18-4B on page 102.

✓ Please delete Graphs 18-5A, 18-5B and 18-5C on page 103.

✓ Please delete Graphs 18-5D and 18-5E on page 103A.

✓ Please delete Graphs 18-6A and 16-6B on page 104.

✓ Please delete Graphs 18-7A and 18-7B on page 105.

✓ Please delete Graphs 18-8A, 18-8B, 18-8C and 18-8D on page 106.

✓ Please delete Graph 18-9 on page 107.

Please amend the paragraph beginning on page 112, line 1 as follows:

C44
Bioassay Procedure. All bioassays were choice tests conducted using a vertical glass "Y" tube apparatus filled with 3-mm glass beads (Bernklau and Bjostad 1998) (Fig. 62). Volatile compounds were prepared in 35-ml polyethylene syringes (cat no. 106-0490, Sherwood Medical, St. Louis, MO) and a syringe pump (Sage Model 355, Fisher Scientific, Pittsburgh, PA) was used to provide, slow (1 ml per min) consistent delivery of the compounds into each choice arm of the bioassay apparatus. Twenty newly-hatched larvae (less than 12-hours-old) were used for each bioassay. Non-diapausing larvae were used for all experiments unless otherwise indicated below. For each choice test a minimum of 10 replicates were conducted.

Please amend the paragraph beginning on page 119, line 23 as follows:

C45
cont.
Petri Dish Bioassay. The attraction of western corn root worm larvae to volatile compounds other than CO₂ was previously reported by our laboratory on the basis of

C45
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experiments conducted using a petri dish bioassay apparatus (Hibbard and Bjostad 1988, 1989; Bjostad and Hibbard 1992). The results we have now obtained using the Y-tube apparatus conflict with these reports, and we conducted experiments using the petri dish bioassay apparatus to re-investigate the results reported previously (Hibbard and Bjostad 1988). Three plastic petri dishes (5 cm diameter) were connected with 2-cm lengths of Teflon tubing (10 mm diameter) inserted into holes in their sides (Fig. 75). Holes were cut with a brass tube attached to a soldering iron. The bottoms of the 2 end dishes had 12 mm holes melted through their centers. The apparatus was supported on a ring stand. Cryogenic collections of corn seedlings were prepared as described above, except that no filter paper strip was placed in the bottom of the collection tube. When the tube had warmed to room temperature, it was flushed for 10 sec with 100% CO₂ from a tank at 4 psi, then inverted for 30 sec. For the control side, an empty sample tube was similarly flushed with CO₂ for 10 sec and inverted for 30 sec. Immediately after inversion for 30 sec, each tube was capped and allowed to sit for 15 min to allow the CO₂ to equilibrate. The petri dish apparatus was assembled and a bubble level was used to insure that the apparatus was not tilted to 1 side or the other. When GC-MS-SIM measurements indicated that the CO₂ concentrations in the tubes were equal (measured through pinholes in the caps from within 5 cm of the top of the tubes) both tubes were connected with a Teflon connector to the holes in the bottom of the end dishes of the bioassay apparatus. The covers were placed on all 3 dishes and the apparatus was allowed to sit for 5 min to allow volatile compounds to begin diffusing. After 5 min, 10 2nd-instar western corn root worm larvae were placed in the center of the middle Petri dish and the cover was replaced. The number of larvae in each of the chambers and in the sample tubes was recorded every 5 min for a total of 30 min. All bioassays were conducted in dim lighting. CO₂ concentrations within the 3-petri-dish apparatus were measured by removing samples through a pinhole in each Teflon connector. A 5- μ l sample was taken from each side every 60 sec throughout the 30-minute period and analyzed using GC-MS-SIM. Twenty replicates of the behavioral bioassay were conducted, and CO₂ measurements were taken for 8 replicates.

Please amend the paragraph beginning on page 121, line 26 as follows:

C46
Corn Headspace Versus CO₂. For the non-diapausing strain of western corn root worm, significantly more larvae ($P < 0.05$) chose the corn headspace side (Fig. 63) when the control syringe contained ambient room air. There was no significant difference between the number of larvae that chose the corn headspace and larvae that chose the control when the CO₂ concentrations were the same (Fig. 64). Larvae chose the control side significantly more often when the control contained twice the concentration of CO₂ as the corn headspace.

Please amend the paragraph beginning on page 122, line 4 as follows:

C47
Corn Headspace Versus CO₂ with Diapausing Larvae. Similar results were obtained with the diapausing strain of western corn root worm. Significantly more of the larvae ($P < 0.05$) chose the corn headspace side when the control syringe contained ambient room air (Fig. 65). There was no significant difference between the number of larvae that chose the corn headspace and larvae that chose the control when the CO₂ concentrations were the same (Fig. 66). Larvae chose the control side significantly more often when the control contained twice the concentration of CO₂ as the corn headspace.

Please amend the paragraph beginning on page 122, line 15 as follows:

C48
Corn Headspace-Coated Glass Beads Versus CO₂. Significantly more larvae ($P < 0.05$) chose the corn-coated beads and corn headspace side of the bioassay when the control side contained ambient room air (Fig. 67). There was no significant difference between the number of larvae that chose the corn headspace and larvae that chose the control when the CO₂ concentrations were the same (Fig. 68). Larvae chose the control side significantly more often when the control contained twice the concentration of CO₂ as the corn headspace.

Please amend the paragraph beginning on page 122, line 25 as follows:

C49
cont
Headspace from Corn in Soil Versus CO₂. The larvae chose the corn-coated beads and corn headspace significantly more often ($P < 0.05$) when the control syringe contained ambient room air (Fig. 69). Significantly more larvae chose the CO₂ control over the corn

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headspace when the CO₂ concentrations were the same (Fig. 70). Larvae chose the control side significantly more often when the control contained twice the concentration of CO₂ as the corn headspace.

Please amend the paragraph beginning on page 123, line 1 as follows:

C50
Soil Bioassay. The larvae chose the soil from growing corn roots significantly more often ($P < 0.05$) (Fig. 71) when the syringe on the corn side contained a higher concentration of CO₂ than the control side (Fig. 72). There was no significant difference between the number of larvae that chose the corn headspace and larvae that chose the control when the CO₂ concentrations were the same. Larvae chose the control side more often when the control contained twice the concentration of CO₂ as the treatment side.

Please amend the paragraph beginning on page 127, line 11 as follows:

C51
Corn Headspace From Western Corn root worm-Damaged Corn Versus CO₂. The larvae chose the headspace from damaged corn seedlings significantly more often ($P < 0.05$) when the control syringe contained ambient room air (Fig. 73). Significantly more larvae chose the CO₂ control over the corn headspace when the CO₂ concentrations were the same (Fig. 74). Larvae chose the control side significantly more often when the control contained twice the concentration of CO₂ as the corn headspace.

Please amend the paragraph beginning on page 124, line 3 as follows:

C52
Petri Dish Bioassay. There was no significant difference between the number of larvae that chose the cryogenic collection of corn volatiles and larvae that chose the control ($P > 0.05$) in the petri dish bioassay (Fig. 76). During the 30 min that the bioassay was run, there was no significant difference between the CO₂ concentration on the corn side and the control side inside the petri dish apparatus (Fig. 77).

✓
Please delete the paragraphs beginning on page 128, line 1 through page 130, line 6.

✓
Please delete Graphs 19-1A, 19-1B, 19-1C, 19-1D and 19-1E on page 131.

- ✓ Please delete Graphs 19-2A and 19-2B on page 132.
- ✓ Please delete Graphs 19-3A and 19-3B on page 133.
- ✓ Please delete Graphs 19-4A and 19-4B on page 134.
- ✓ Please delete Graphs 19-5A and 19-5B on page 135.
- ✓ Please delete Graphs 19-6A, 19-6B and 19-6C on page 136.